REMARKS

Claims 1 to 22 and 24 are pending in the application, of which claims 1, 13 and 24 are independent. Favorable reconsideration and further examination are requested.

Claims 1 to 4, 9 to 12 and 21 to 23 were rejected over U.S. Patent No. 6,188,307 (Katsuki); claims 13, 15, 19 and 20 were rejected over U.S. Patent No. 5,867,083 (Takeuchi) in view of Katsuki; and claims 5, 6, 8 and 14 were rejected over Katsuki in view of U.S. Patent No. 6,188,307 (Smith). As shown above, Applicants have amended claims 1 and 13 to recite that all terminals of assembly are on the underside of the housing for surface-mounting the assembly, and that the housing has an upper side that is contact-voltage proofed. The applied art is not understood to disclose or to suggest these features of the claims.

In this regard, referring to its Fig. 1, Katsuki discloses a thermistor apparatus having an insulating case 1, two PTC-thermistor devices 5, 6, and terminals 10, 11, 12, 13. Ends 10a, 11a, 12a and 13a of the terminals protrude from insulating case 1, as shown in the figure. This configuration, with the protruding terminals, is clearly intended for through-hole mounting, not surface mounting as required by the claims. The enclosed excerpts taken from wikipedia.org explain differences between surface mounting and through-hole mounting.

In Figs. 4 and 5, Katsuki discloses a second embodiment of its thermistor apparatus. There, Katsuki shows an insulating case 21, two PTC-thermistor elements 25, 26, two protruding terminals 30, 31, and two spring terminals 32, 33. Spring terminals include electrodes 32a, 33a, which are on the upper side of the thermistor apparatus, and thus cover the openings of cavities 21a and 21b. Since electrodes 32a and 33a are on the upper side of Katsuki's insulating case (the

alleged counterpart to the claims' housing), the upper side of Katsuki's insulating case is not contact-voltage proofed, as required by the claims.

For at least the foregoing reasons, Applicants submit that claims 1 and 13 define over Katsuki. Page 6 of the Office Action admits that Takeuchi does not disclose a housing; therefore, Takeuchi does not make up for the foregoing deficiencies of Katsuki vis-à-vis claims 1 and 13. Accordingly, claims 1 and 13 are believed to be allowable.

New independent claim 24 recites that the housing comprises a liquid crystal polymer (LCP) material. The are is not believed to disclose or to suggest such a feature in combination with the other features of the claim. Accordingly, claim 24 is believed to be patentable.

Each of the dependent claims is also believed to define patentable features of the invention. Each dependent claim partakes of the novelty of its corresponding independent claim and, as such, has not been discussed specifically herein.

It is believed that all of the pending claims have been addressed. However, the absence of a reply to a specific rejection, issue or comment does not signify agreement with or concession of that rejection, issue or comment. In addition, because the arguments made above may not be exhaustive, there may be reasons for patentability of any or all pending claims (or other claims) that have not been expressed. Finally, nothing in this paper should be construed as an intent to concede any issue with regard to any claim, except as specifically stated in this paper, and the amendment of any claim does not necessarily signify concession of unpatentability of the claim prior to its amendment.

In view of the foregoing amendments and remarks, Applicant respectfully submits that the application is in condition for allowance, and such action is respectfully requested at the Examiner's earliest convenience.

Applicant's undersigned attorney can be reached at the address shown below. All telephone calls should be directed to the undersigned at 617-521-7896.

Respectfully submitted,

Date: February 20, 2007

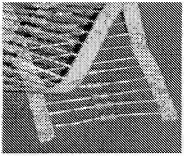
Paul A. Pysher
Reg. No. 40,780

Fish & Richardson P.C.
225 Franklin Street
Boston, MA 02110
Telephone: (617) 542-5070
Facsimile: (617) 542-8906

083.doc

Through-hole technology

From Wikipedia, the free encyclopedia



Through-hole (leaded) resistors

Through-hole technology, also spelled "thru-hole", refers to the mounting scheme used for electronic components that involves the use of pins on the components that are inserted into holes drilled in printed boards and soldered to pads on the opposite side.

While through-hole mounting provides strong mechanical bonds when compared to surface-mount technology techniques, the additional drilling required makes the boards more expensive to produce. They also limit the available routing area for signal traces on layers immediately below the top layer on multilayer boards since the holes must pass through all layers to the opposite side. To that end, through-hole mounting techniques are now usually reserved for bulkier components such as electrolytic capacitors or semiconductors in larger packages such as the TO220 that require the additional mounting strength.

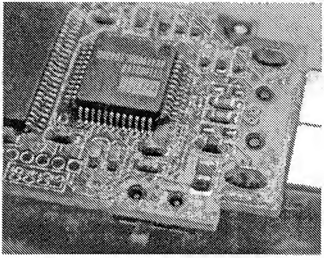
Design engineers often prefer the larger through-hole to surface mount parts when prototyping because they are easier to handle, insert, and solder. A rule of thumb for creating a through-hole on a PCB is to make the drill diameter 0.008" larger then the part's lead. To install a SIL through-hole part (e.g. resistor, capacitors, and diodes), bend leads 90 degrees in the same direction, insert the part in the board, bend leads located on the backside of the board in opposing directions to improve the part's mechanical strength; finally, solder the leads such that the solder seeps through to both sides of the board.

Retrieved from "http://en.wikipedia.org/wiki/Through-hole_technology"

Categories: Electronic design | Electronics manufacturing | Chip carriers | Electronics stubs

Surface-mount technology

From Wikipedia, the free encyclopedia



Surface-mount components on a keydrive's circuit board

Surface mount technology (SMT) is a method for constructing electronic circuits in which the components are mounted directly onto the surface of printed circuit boards (PCBs). Electronic devices so made are called *surface-mount devices* or **SMDs**. In the industry it has largely replaced the previous construction method of fitting components with wire leads into holes in the circuit board (also called through-hole technology).

An SMT component is usually smaller than its leaded counterpart because it has no leads or smaller leads. It may have short pins or leads of various styles, flat contacts, a matrix of balls (BGAs), or terminations on the body of the component (passives).

Contents

History

Surface-mount technology was developed in the 1960s and became widely used in the late 1980s. Much of the pioneering work in this technology was done at IBM. Components were mechanically redesigned to have small metal tabs or end caps that could be directly soldered to the surface of the PCB. Components became much smaller and component placement on both sides of the board became far more common with surface-mounting than through-hole mounting, allowing much higher circuit densities. Often, only the solder joints hold the parts to the board, although parts on the bottom or "second" side of the board are temporarily secured with a dot of adhesive as well. Surface-mounted devices (**SMDs**) are usually made physically small and lightweight for this reason. Surface mounting lends itself well to a high degree of automation, reducing labor cost and greatly increasing production rates. SMDs can be one-quarter to one-tenth the size and weight, and one-half to one-quarter the cost of through-hole parts.